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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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6884

20741

7590

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EXAMINER

POLYANSKY, ALEXANDER

ART UNIT

PAPER NUMBER

1735

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/577,914	<b>Applicant(s)</b> MOLL ET AL.	
	<b>Examiner</b> ALEXANDER POLYANSKY	<b>Art Unit</b> 1735	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 October 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### **Election/Restrictions**

Applicant's election without traverse of group I in the reply filed on October 4, 2010 is acknowledged.

Claims 1-11 remain for examination.

### **Specification**

At present, the instant specification is not in accordance with US practices.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

### **Arrangement of the Specification**

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
- (f) BACKGROUND OF THE INVENTION.
  - (1) Field of the Invention.
  - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (g) BRIEF SUMMARY OF THE INVENTION.
- (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (i) DETAILED DESCRIPTION OF THE INVENTION.
- (j) CLAIM OR CLAIMS (commencing on a separate sheet).
- (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

### **Claim Objections**

Claims 5-8 and 10 are objected to because of the following informalities:

In claims 5-8 and 10, the claimed "composite material" should read --composite materials-- to be consistent with the claimed "materials" as set forth in claim 1.

Appropriate correction is required.

### **Claim Rejections - 35 USC § 112**

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

I. In claim 1, line 3; it is not clear how the alleged  $Mg_2Si$  can be produced without the addition of Si, because the instant claim only requires "at least one portion of magnesium". Even though the claim also requires a magnesium alloy, which could contain Si, but it would not be present inherently. Page 5 of the instant specification delineates an equation necessitating the addition of Si for the metal matrix production. It would behoove applicant to positively recite Si in claim 1.

II. a. In claim 4, lines 1-3; the claimed phrase "and/or" is indefinite, because it is not clear whether both a forging and a extrusion step is required. For the purposes of examination, the claimed feature will be construed to recite "or".

b. In claim 4, line 2; the claimed "and/or" appears to be either misplaced or unnecessary. For the purposed of examination, the claimed "and/or" in line 2 will be ignored.

III. In claim 7, line 3; the claimed phrase "and/or" is indefinite, because it is not clear whether both or one of the respective constituents is required. For purposes of examination, the claimed feature will be construed to recite "or".

IV. Claim 4 recites the limitation "of the particles of Si" in line 3. There is insufficient antecedent basis for this limitation in the claim. Si is not claimed in claim 1.

V. a. Claim 11 recites the limitation "after adding Si" in line 1. There is insufficient antecedent basis for this limitation in the claim. Si is not claimed in claim 1.

For purposes of examination, it will be assumed that claim 1 further requires the addition of Si or Si alloy.

b. Claim 11 recites the limitation "thixomolding device" in line 2. There is insufficient antecedent basis for this limitation in the claim. Although it is understood that the claimed process utilizes some sort of a casting device or machine, i.e. the claimed thixomolding device, it is not claimed in claim 1; thus, the limitation of claim 11 line 2 "the thixomolding device" should read --the thixomolding process--.

### **Claim Rejections - 35 USC § 102**

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1, 2, 8, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Nishino JP 2000-017352 (IDS).**

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**Regarding claim 1**, Nishino teaches incorporating spherical and/or ellipsoidal  $Mg_2Si$  particles having specified average particle size dispersed into a matrix composed of Mg or an Mg alloy (title and abstract), wherein Nishino produces metal-matrix composite materials (title and abstract) comprising at least one portion of magnesium or of a magnesium alloy and at least one production step in which thixomolding takes place (semi-solid or semi-molten metal casting par. 5, for example, which satisfies the thixomolding limitation), wherein a  $Mg_2Si$  phase with a volumetric content of 3-50%, which meets the required “of at least 2%”, is dispersed into the metal matrix (pars. 17, 24, and etc.).

**Regarding claim 2**, since Nishino teaches the metal matrix comprises  $Mg_2Si$ , which comprises Mg and Mg alloy, it meets the claim.

**Regarding claim 8**, Nishino teaches addition of 2 to 10% Si (par. 13), which is inside the claimed range of roughly 2 to roughly 15%.

**Regarding claim 10**, Nishino teaches AM50 magnesium alloy is used (par. 28), which meets one of the alloy in the claimed Markush group.

### **Claim Rejections - 35 USC § 102/103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 3-4 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Nishino as applied above.**

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**Regarding claim 3**, Nishino teaches a grain (granulate) of Si (par. 9) is processed jointly with a Mg or a Mg alloy to produce a  $Mg_2Si$  grains at the boundaries (par. 16, drawing 5, for one). Nishino does not specify having a granulate of Mg or Mg alloy as the claim requires. However, Nishino processes the grain of Si with the Mg or Mg alloy in the semi-molten state which would expectedly contain granulates of Mg or granulates of a Mg alloy, and because the claim does not preclude the joint processing of the Mg or Mg alloy in the semi-molten state mixture of the granulates, the joint processing step of Nishino meets the requirement for a joint processing step as claimed.

Alternatively, it would be obvious to one of ordinary skill in the art that the Mg alloy semi-melt of Nishino would comprise Mg grains (granulates) because the boundaries within the crystal lattice of the Mg alloy semi-melt (for instance a Al-Mg alloy) would be comprised of Mg grains. Thus, the joint processing step of Nishino meets the requirement for a joint processing step as claimed in lines 1-3 of claim 3.

**Regarding claim 4**, Nishino teaches that if there are few additions of Si grain, there are also few generated amounts of  $Mg_2Si$  in a matrix, and sufficient improvement in the characteristic of composite cannot be expected. On the other hand, when there are many additions of Si grain, by a volume rate to Si by generation of about 3 times as many  $Mg_2Si$  grains (machine translation par. 17).

In view of the foregoing, the claimed feature “**wherein the amount of  $Mg_2Si$  phase crystallites which form a silicon content of a composite material are determined via the amount of the particles of silicon or of the silicon alloy**”, is met.

**Claim Rejections - 35 USC § 103**

**Claims 5-7 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishino as applied to claim 1 above, and further in view of Fujita US 5,902,424.**

**Regarding claims 5-7**, although Nishino does not preclude or teach away from performing additional steps, Nishino does not specify any subsequent processing steps after the Mg alloy has been cast.

Fujita teaches a method of making an article of manufacture made of a magnesium alloy (title and abstract), wherein magnesium alloy materials are micronized by forging in order to improve the physical properties thereof (Fujita col. 2, lines 22-26).

It would be obvious to one of ordinary skill in the art to modify the process of Nishino by incorporating the forging step of Fujita in order to improve the physical properties of magnesium alloy materials (Fujita col. 2, lines 22-26).

**Regarding claim 9**, Nishino teaches the volumetric content of  $Mg_2Si$  is 3 to 50% (par. 17) which overlaps the claimed 5 to 40%. See MPEP 2144.05(I).

**Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishino as applied to claim 1 above, and further in view of Bredzs US 3,415,697.**

**Regarding claim 11**, Nishino does not specify reducing the heating rate due to the addition of Si.

Bredzs teaches when mixing alloys of Mg and Si, i.e. Al-Mg and Al-Si, due to the high affinity of Mg for Si a highly exothermic reaction takes place to form  $Mg_2Si$  (Bredzs col. 3, lines 24-50). Bredzs further discloses that the heat of formation of  $Mg_2Si$  at room temperature is 19



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Cal/mole (col. 3, lines 64-68), which is so extraordinarily high that it is capable of melting approximately 200 g of pure Al (pure Al having a melting temperature of 660°C).

It would be obvious to one of ordinary skill in the art to reduce the heating rate when the melt first forms of the semi-solid casting device (thixomolding device) of Nishino because of the nature of the reaction of Mg with Si as described in Bredzs (col. 3, lines 24-50, and 64-68).

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXANDER POLYANSKY whose telephone number is (571)270-5904. The examiner can normally be reached on Monday-Friday, 8:00 a.m. EST - 5:00 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica L. Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alexander Polyansky/  
Examiner, Art Unit 1735

/Jessica L. Ward/  
Supervisory Patent Examiner, Art Unit 1735